1/5

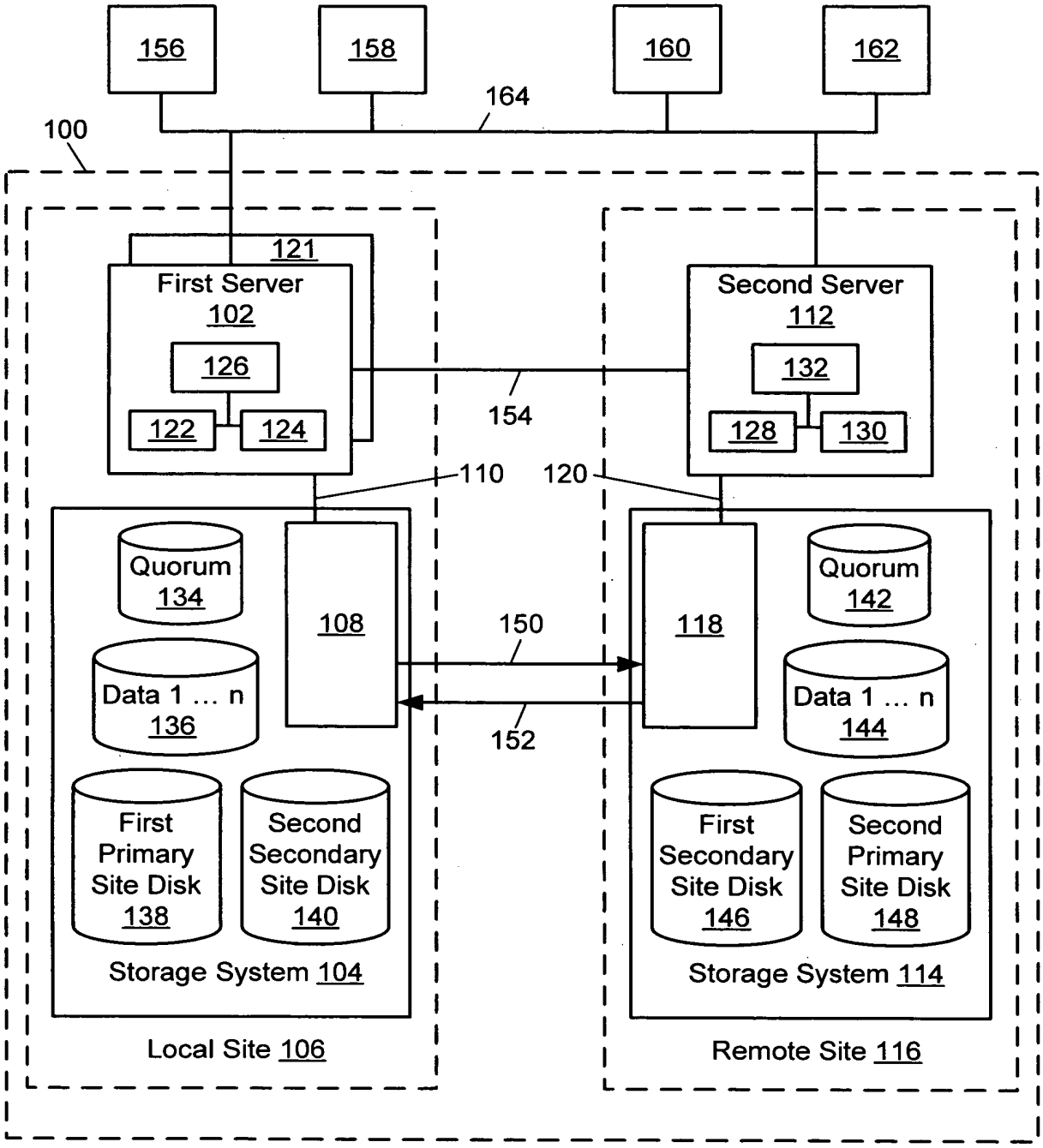
156
158
160
162
164
100
121
First Server
102
126
122
124
Second Server
112
132
128
130
154
110
120
Quorum
134
108
150
118
Quorum
142
Data 1 ... n
136
152
Data 1 ... n
144
First
Primary
Site Disk
138
Second
Secondary
Site Disk
140
First
Secondary
Site Disk
146
Second
Primary
Site Disk
148
Storage System 104
Storage System 114
Local Site 106
Remote Site 116

FIG. 1

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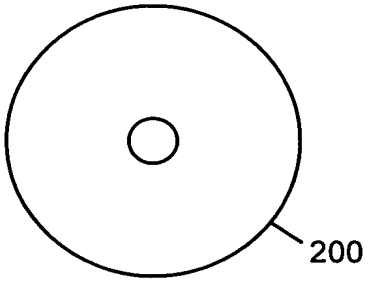
200

FIG. 2

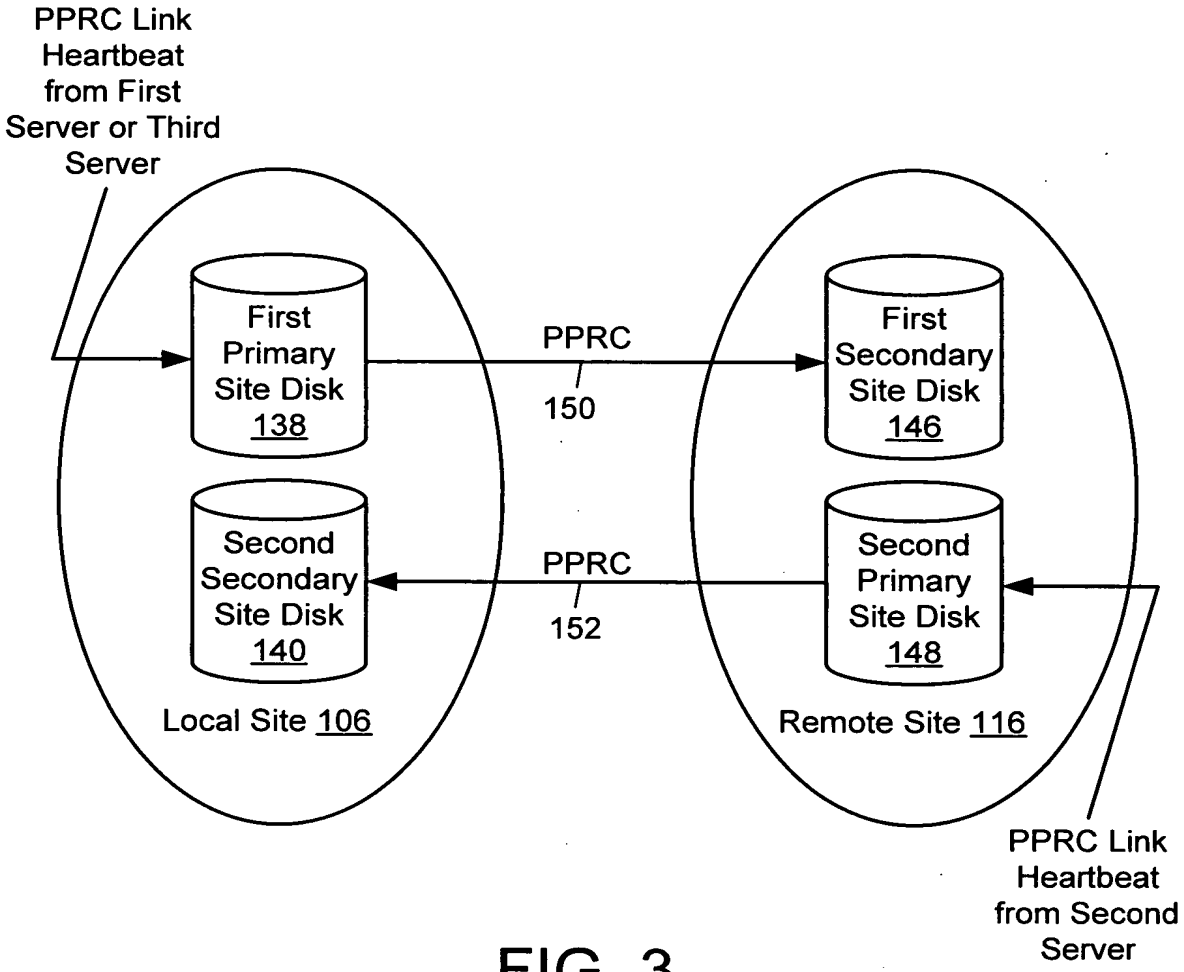
PPRC Link Heartbeat from First Server or Third Server
First Primary Site Disk 138
PPRC
150
First Secondary Site Disk 146
Second Secondary Site Disk 140
PPRC
152
Second Primary Site Disk 148
Local Site 106
Remote Site 116
PPRC Link Heartbeat from Second Server

FIG. 3

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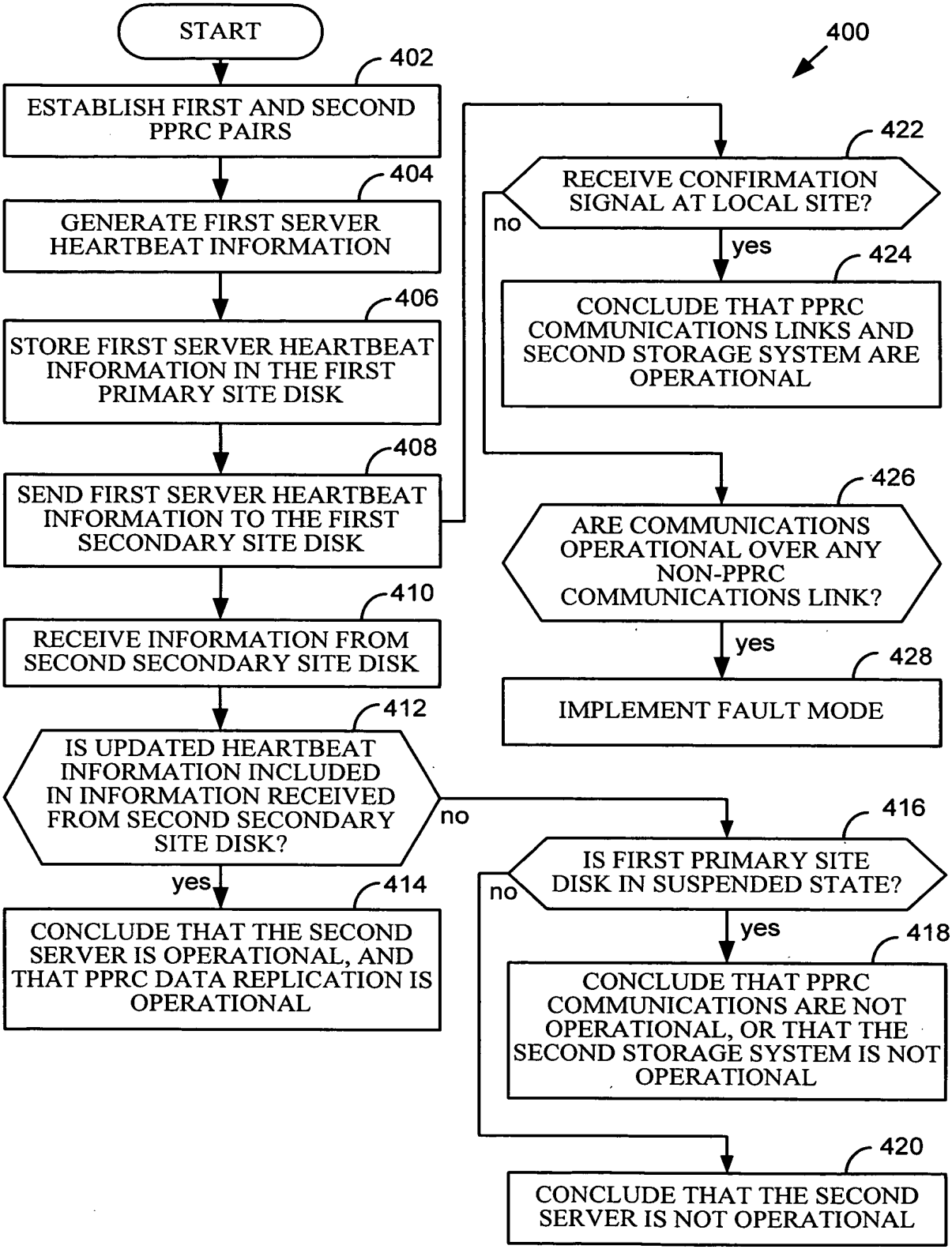
START
400
402
ESTABLISH FIRST AND SECOND PPRC PAIRS
404
GENERATE FIRST SERVER HEARTBEAT INFORMATION
406
STORE FIRST SERVER HEARTBEAT INFORMATION IN THE FIRST PRIMARY SITE DISK
408
SEND FIRST SERVER HEARTBEAT INFORMATION TO THE FIRST SECONDARY SITE DISK
410
RECEIVE INFORMATION FROM SECOND SECONDARY SITE DISK
412
IS UPDATED HEARTBEAT INFORMATION INCLUDED IN INFORMATION RECEIVED FROM SECOND SECONDARY SITE DISK?
yes
414
CONCLUDE THAT THE SECOND SERVER IS OPERATIONAL, AND THAT PPRC DATA REPLICATION IS OPERATIONAL
no
416
IS FIRST PRIMARY SITE DISK IN SUSPENDED STATE?
no
yes
418
CONCLUDE THAT PPRC COMMUNICATIONS ARE NOT OPERATIONAL, OR THAT THE SECOND STORAGE SYSTEM IS NOT OPERATIONAL
420
CONCLUDE THAT THE SECOND SERVER IS NOT OPERATIONAL
422
RECEIVE CONFIRMATION SIGNAL AT LOCAL SITE?
no
yes
424
CONCLUDE THAT PPRC COMMUNICATIONS LINKS AND SECOND STORAGE SYSTEM ARE OPERATIONAL
426
ARE COMMUNICATIONS OPERATIONAL OVER ANY NON-PPRC COMMUNICATIONS LINK?
yes
428
IMPLEMENT FAULT MODE

FIG. 4A

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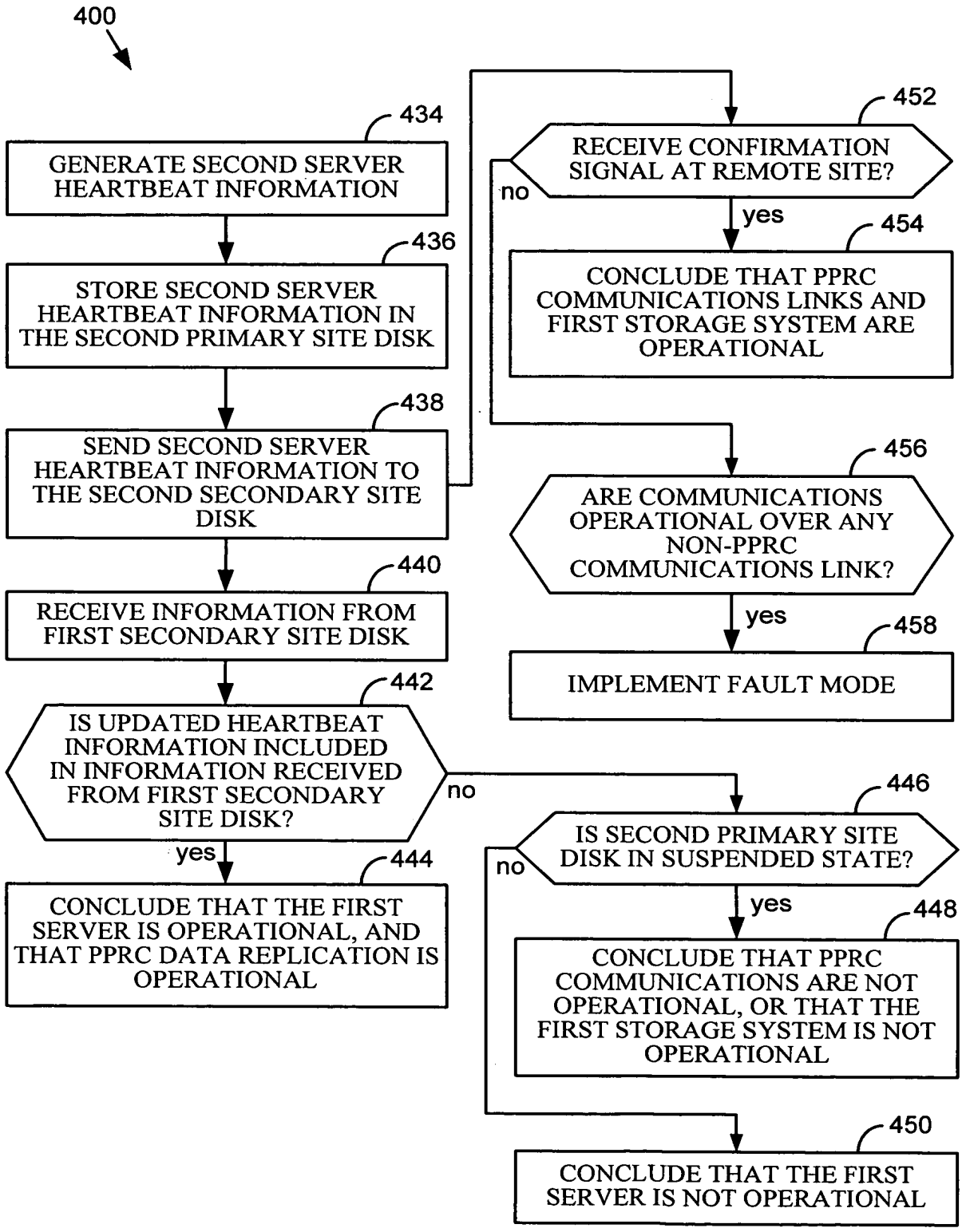
400
434
GENERATE SECOND SERVER HEARTBEAT INFORMATION
436
STORE SECOND SERVER HEARTBEAT INFORMATION IN THE SECOND PRIMARY SITE DISK
438
SEND SECOND SERVER HEARTBEAT INFORMATION TO THE SECOND SECONDARY SITE DISK
440
RECEIVE INFORMATION FROM FIRST SECONDARY SITE DISK
442
IS UPDATED HEARTBEAT INFORMATION INCLUDED IN INFORMATION RECEIVED FROM FIRST SECONDARY SITE DISK?
yes
444
CONCLUDE THAT THE FIRST SERVER IS OPERATIONAL, AND THAT PPRC DATA REPLICATION IS OPERATIONAL
no
446
IS SECOND PRIMARY SITE DISK IN SUSPENDED STATE?
no
yes
448
CONCLUDE THAT PPRC COMMUNICATIONS ARE NOT OPERATIONAL, OR THAT THE FIRST STORAGE SYSTEM IS NOT OPERATIONAL
450
CONCLUDE THAT THE FIRST SERVER IS NOT OPERATIONAL
452
RECEIVE CONFIRMATION SIGNAL AT REMOTE SITE?
no
yes
454
CONCLUDE THAT PPRC COMMUNICATIONS LINKS AND FIRST STORAGE SYSTEM ARE OPERATIONAL
456
ARE COMMUNICATIONS OPERATIONAL OVER ANY NON-PPRC COMMUNICATIONS LINK?
yes
458
IMPLEMENT FAULT MODE

FIG. 4B

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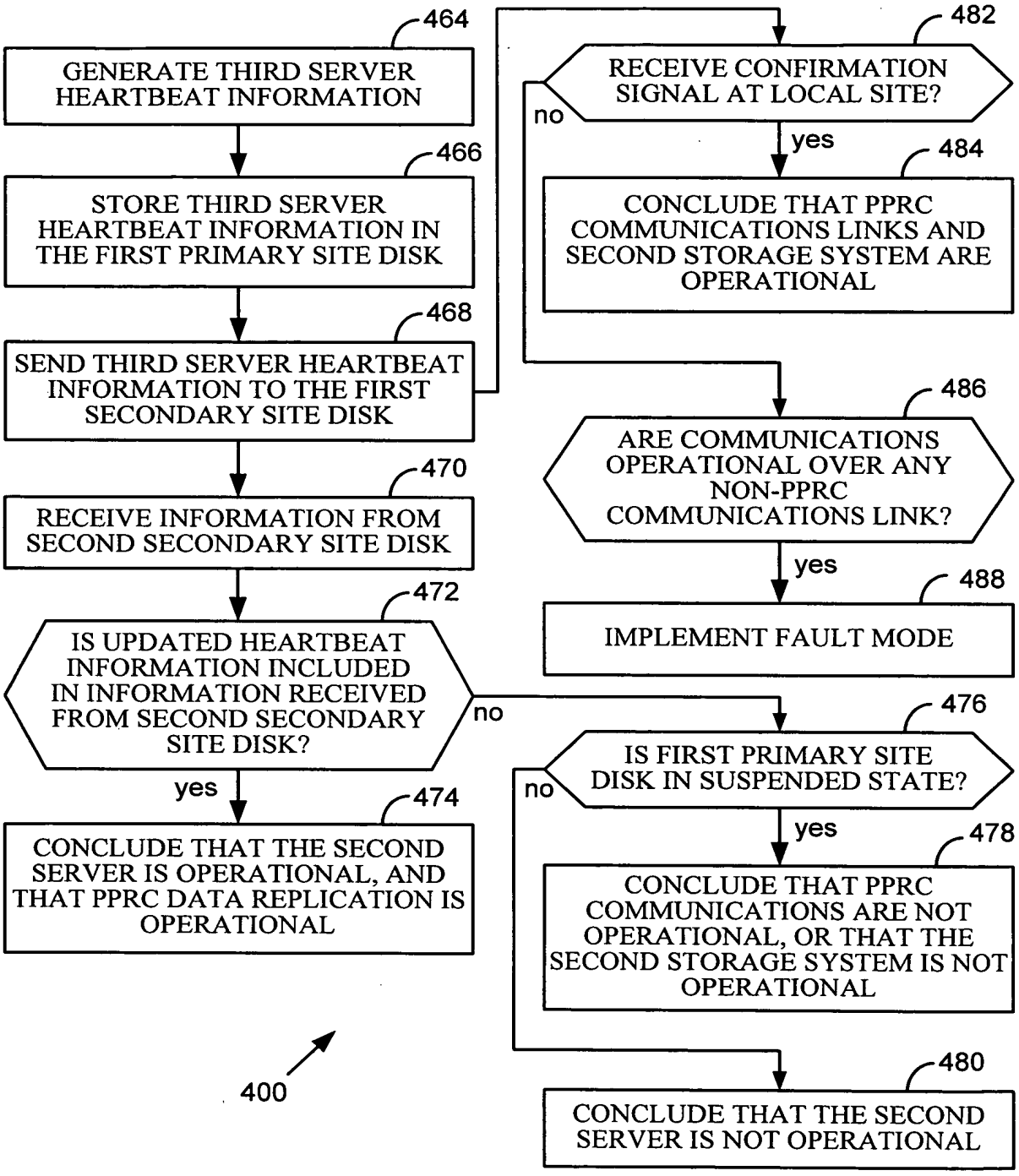
464
GENERATE THIRD SERVER HEARTBEAT INFORMATION
466
STORE THIRD SERVER HEARTBEAT INFORMATION IN THE FIRST PRIMARY SITE DISK
468
SEND THIRD SERVER HEARTBEAT INFORMATION TO THE FIRST SECONDARY SITE DISK
470
RECEIVE INFORMATION FROM SECOND SECONDARY SITE DISK
472
IS UPDATED HEARTBEAT INFORMATION INCLUDED IN INFORMATION RECEIVED FROM SECOND SECONDARY SITE DISK?
yes
474
CONCLUDE THAT THE SECOND SERVER IS OPERATIONAL, AND THAT PPRC DATA REPLICATION IS OPERATIONAL
no
476
IS FIRST PRIMARY SITE DISK IN SUSPENDED STATE?
no
yes
478
CONCLUDE THAT PPRC COMMUNICATIONS ARE NOT OPERATIONAL, OR THAT THE SECOND STORAGE SYSTEM IS NOT OPERATIONAL
480
CONCLUDE THAT THE SECOND SERVER IS NOT OPERATIONAL
482
RECEIVE CONFIRMATION SIGNAL AT LOCAL SITE?
no
yes
484
CONCLUDE THAT PPRC COMMUNICATIONS LINKS AND SECOND STORAGE SYSTEM ARE OPERATIONAL
486
ARE COMMUNICATIONS OPERATIONAL OVER ANY NON-PPRC COMMUNICATIONS LINK?
yes
488
IMPLEMENT FAULT MODE
400

FIG. 4C